in a vertical direction of the printing head to the raster lines to be printed in a predetermined printing range;

a print data forming unit that forms the print data to be printed;

a printer driver that determines the position of a print-starting raster line and the number of printing passes, consults the raster-line/pin-relationship table, and outputs a pin driving signal for each driving pass according to the raster-line/pin-relationship table;

a printing head transferring unit that transfers the printing head to a predetermined position based on the signal from the printer driver; and

a data transmitting unit that transmits print data and information required for printing operation received from the printer driver;

the printing range based on the vertical resolution of the print data, the pitch of the pins of the printing head, an amount of a unit of vertical transfer of the printing head, the position of the print-starting raster line, and a number of passes in a horizontal direction required for printing the predetermined printing range.

REMARKS

Claims 1-6 are pending. By this Amendment, claims 1 and 6 are amended. Reconsideration in view of the above amendments and following remarks is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten claim (37 C.F.R. §1.121(c)(1)(ii)).

The Office Action objects to the drawings under 37 C.F.R. §1.84(p)(5). Applicant amends Fig. 1 in the attached Request for Approval of Drawing Corrections. Accordingly, Applicant respectfully requests that the objection to the drawings be withdrawn.

The Office Action claims 1-10 under 35 U.S.C. §102(e) as being anticipated by Kakutani (U.S. Patent No. 6,158,841); claims 1-10 are rejected under 35 U.S.C. §103(a) as

being unpatentable over Saito (U.S. Patent No. 5,874,970) in view of Erickson (U.S. Patent No. 5,592,202). Applicant respectfully traverses the rejections.

In particular, Applicant asserts that neither Kakutani, Saito or Erickson, either alone or in combination, discloses or suggests the method for controlling a printer that has a printing head for printing data, including at least a step of examining a relationship of a position, in each printing pass, of each of a plurality of a pins provided in a vertical direction of the printing head to a plurality of raster lines to be printed in a predetermined printing range, based on a vertical resolution of the print data, when a unit of vertical transfer of the printing head is not a reciprocal of an integral vertical resolution of the print data, and a pitch of the pins of the printing head is not any one of an integral multiple of the vertical resolution and the reciprocal of the integral vertical resolution, as recited in independent claim 1, and similarly recited in independent claim 6.

Specifically, Kakutani discloses that because conventional dot recording schemes have strict restrictions in the number of nozzles N and the nozzle pitch k, and do not have much flexibility, Kakutani provides a technique that enables a system to flexibly dot recording schemes. See col. 2, lines 38-45.

Saito discloses a serial printer with a print head which performs raster scanning on a print medium, such as a sheet of paper, and a printing method utilizing the raster scanning.

Erickson discloses a scanning head ink jet printer that prints at high speed to produce large format output of graphics quality.

In stark contrast to Applicant's claimed invention, neither Kakutani, Saito or Erickson disclose or suggest a method for controlling a printer that has a printing head for printing data, including the step of examining a relationship of a position, in each printing pass, of each of a plurality of a pins provided in a vertical direction of the printing head to a plurality of raster lines to be printed in a predetermined printing range, based on a vertical resolution

of the print data, when a unit of vertical transfer of the printing head is not a reciprocal of an integral vertical resolution of the print data, and a pitch of the pins of the printing head is not any one of an integral multiple of the vertical resolution and the reciprocal of the integral vertical resolution.

On the contrary, nowhere in the applied references is it disclosed or suggested that a method or apparatus examines a relationship of the position of pins and the raster lines when, for example, the vertical and horizontal resolutions of print data to be printed differ from the vertical and horizontal resolutions of which a printer can process. Accordingly, the methods or apparatuses in the applied references cannot perform resolution conversion to compensate for this difference.

Accordingly, because Kakutani fails to disclose each and every feature as the claimed invention, and because the combination of Saito and Erickson would not have resulted in the claimed invention, Applicant asserts that independent claims 1 and 6 define patentable subject matter. Claims 2-4 and 7-10 depend from the independent claims and therefore also define patentable subject matter. Accordingly, Applicant respectfully requests that the rejections under 35 U.S.C. §102(e) and 35 U.S.C. §103(a) be withdrawn.

In view of the foregoing amendments and remarks, Applicant submits that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-10 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicant's attorney at the telephone number set forth below.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Michael Britton
Registration No. 47,260

JAO:MQB/jfl

Attachments:
Petition for Extension of Time
Appendix
Request for Approval of Drawing Corrections

Date: March 11, 2003

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 15-0461

APPENDIX

Changes to Claims:

The following is a marked-up version of the amended claims:

1. (Amended) A method for controlling a printer that has a printing head for printing data, ~~in which a unit of vertical transfer of a printing head is not a reciprocal of an integral vertical resolution of print data, and a pitch of pins of the printing head is not any one of an integral multiple of the vertical resolution and the reciprocal of the integral vertical resolution~~ the method comprising the steps of:

examining ~~the~~ a relationship of a position, in each printing pass, of each of a plurality of ~~the~~ a pins provided in ~~the~~ a vertical direction of the printing head to a plurality of raster lines to be printed in a predetermined printing range, based on ~~the~~ a vertical resolution of the print data, when a unit of vertical transfer of the printing head is not a reciprocal of an integral vertical resolution of the print data, and a pitch of the pins of the printing head is not any one of an integral multiple of the vertical resolution and the reciprocal of the integral vertical resolution; ~~the pitch of the pins of the printing head, the amount of a unit of vertical transfer of the printing head, the position of a print-starting raster line, and the number of passes in the horizontal direction required for printing the predetermined printing range;~~

preparing a raster-line/pin-relationship table in which pins to be actuated for printing the raster lines to be printed are determined in each printing pass based on the relationship between the position of the pins and the raster lines;

determining a number of printing passes and a position of ~~the~~ a print-starting raster line;

consulting the raster-line/pin-relationship table according to the determination; and

printing the predetermined printing range by actuating the pins in each printing pass based on the raster-line/pin-relationship table~~.~~,

the pitch of the pins of the printing head, the amount of the unit of vertical transfer of the printing head, the position of the print-starting raster line, and a number of passes in the horizontal direction required for printing the predetermined printing range.

6. (Amended) A print-controlling device for a printer that has a printing head for printing data, ~~in which a unit of vertical transfer of a printing head is not a reciprocal of an integral vertical resolution of print data, and a pitch of pins of the printing head is not any one of an integral multiple of the vertical resolution and the reciprocal of the integral vertical resolution,~~ the device comprising:

a raster-line/pin-relationship table describing pins to be actuated in each printing pass for printing raster lines to be printed based on ~~the~~ a relationship between ~~the~~ a position of the pins and the raster lines when a unit of vertical transfer of the printing head is not a reciprocal of an integral vertical resolution of the print data, and a pitch of the pins of the printing head is not any one of an integral multiple of the vertical resolution and the reciprocal of the integral vertical resolution~~,~~, the printing performed by examining ~~a~~ the relationship of ~~a~~ the position, in each printing pass, of each of ~~a~~ the plurality of the pins provided in a vertical direction of the printing head to ~~a plurality of~~ the raster lines to be printed in a predetermined printing range~~, based on the vertical resolution of the print data, the pitch of the pins of the printing head, an amount of a unit of vertical transfer of the printing head, a position of a print-starting raster line, and a number of passes in a horizontal direction required for printing the predetermined printing range~~;

a print data forming unit that forms the print data to be printed;

a printer driver that determines the position of a print-starting raster line and the number of printing passes, consults the raster-line/pin-relationship table, and outputs a pin driving signal for each driving pass according to the raster-line/pin-relationship table;

a printing head transferring unit that transfers the printing head to a predetermined position based on the signal from the printer driver; and

a data transmitting unit that transmits print data and information required for printing operation received from the printer driver~~.~~;

the printing range based on the vertical resolution of the print data, the pitch of the pins of the printing head, an amount of a unit of vertical transfer of the printing head, the position of the print-starting raster line, and a number of passes in a horizontal direction required for printing the predetermined printing range.